

Recovery Plan Action Status

Plan Name: Marsilea villosa Recovery Plan

Plan Status: Final

Plan Date: 18-Apr-96

Lead Agency: USFWS

Lead Office: Pacific Islands Fish And Wildlife Office

(808)

792-9400)

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Ihi' ihi (Marsilea villosa)	1	111	Protect Koko Head	Partially Complete	Prior to FY 1995		City and County of Honolulu, Hawaii, The Nature Conservancy	Acquisition: Management Agreement	Contract, Internal Administrative	TNC entered into a cooperative agreement with HON in 1986 to manage this site. Currently, TNC is in the process of turning the management back to HON, and assisting them in developing a management plan.
Ihi' ihi (Marsilea villosa)	1	112	Protect Lualualei	Complete	FY 1995 - FY 1999	FY 2008	U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, United States Navy	Acquisition: Management Agreement	Species Expert	The Lualualei population occurs within a naval magazine area, and the U.S. Navy is protecting the site in compliance with a biological opinion.
Ihi' ihi (Marsilea villosa)	1	113	Protect Makapu'u	Ongoing Not Current	FY 2006		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Bishop Estate	Acquisition: Management Agreement	Internal Administrative	Discussed protection with State Parks and in process of developing plan for management.
Ihi' ihi (Marsilea villosa)	1	1141	Monitor and control development affecting Koko Head	Discontinued	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, City and County of Honolulu, Hawaii, The Nature Conservancy	Other: Administration	Internal Administrative, Species Expert	The proposed water development in 1993 did not occur, and currently there are no plans for additional development in the area. Should such plans arise, this task will be implemented again.

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Ihī'ihī (Marsilea villosa)	1	1142	Control mongoose at Koko Head	Not Started			City and County of Honolulu, Hawaii, The Nature Conservancy	Management: Habitat Maintenance and Manipulation	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	The impact of mongoose on Marsilea villosa is unclear, and more research should be done before money is spent on control methods.
Ihī'ihī (Marsilea villosa)	1	1143	Control alien plant species at Koko Head	Ongoing Not Current	Prior to FY 1995		City and County of Honolulu, Hawaii, The Nature Conservancy	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	TNC has periodically conducted weed control at the site, but additional efforts are needed for effective weed control.
Ihī'ihī (Marsilea villosa)	1	1144	Limit trampling and off-road vehicle use at Koko Head	Ongoing Current	Prior to FY 1995		City and County of Honolulu, Hawaii, The Nature Conservancy	Management: Habitat Maintenance and Manipulation	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	Fence posts have been erected along with a sign asking for respect of Marsilea villosa. The condition of the posts are periodically monitored.
Ihī'ihī (Marsilea villosa)	1	1145	Reduce risk of fire at Koko Head	Ongoing Current	Prior to FY 1995		City and County of Honolulu, Hawaii, The Nature Conservancy	Management: Habitat Maintenance and Manipulation	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	The control of alien plants at the site also benefits Marsilea villosa by reducing the fuel load to carry fire through the site.
Ihī'ihī (Marsilea villosa)	1	1151	Develop Endangered Species Management Plan at Lualualei	Complete	FY 2000 - FY 2004	FY 2000 - FY 2004	U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, United States Navy	Management: Planning	Contract, Internal Administrative, Species Expert	
Ihī'ihī (Marsilea villosa)	1	1152	Monitor and control development affecting Lualualei	Ongoing Not Current	FY 2008		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, United States Navy	Management: Habitat Maintenance and Manipulation, Research: Other Information, Research: Population Surveys	Contract, Internal Technical Assistance, Species Expert	No development planned for areas where Marsilea occurs in Lualualei.

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Ihi' ihi (Marsilea villosa)	1	1153	Control grazing and trampling by cattle at Lualualei	Ongoing Current	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, United States Navy	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Internal Administrative, Internal Field Assistance	While cattle were listed as a threat in the recovery plan, they are only a threat if at such high levels that Marsilea villosa becomes one of the few plants remaining as fodder. ES and USN have agreed to limited cattle grazing with the Lualualei populations, and USN monitors to ensure that the cattle do not begin grazing Marsilea villosa.
Ihi' ihi (Marsilea villosa)	1	1154	Control mowing at Lualualei	Ongoing Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, United States Navy	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Internal Technical Assistance	USN mows the antenna site at a high enough level to avoid impacts to Marsilea villosa, and avoids mowing during the wet growing season when the mower may sink into the ground and destroy rhizomes of the plant.
Ihi' ihi (Marsilea villosa)	1	1155	Control alien plant species at Lualualei	Ongoing Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, United States Navy	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	USN controls the alien plants in Lualualei through cattle grazing and mowing.

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Ihī'ihī (Marsilea villosa)	1	1156	Reduce risk of fire at Lualualei	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, United States Navy	Management: Habitat Maintenance and Manipulation	Contract, Internal Field Assistance, Internal Technical Assistance	This is currently the biggest threat to Marsilea villosa at this site. Mowing throughout the antenna site protects that subpopulation, but the other site with cattle grazing is at a higher risk, although grazing does reduce the fuel load somewhat. USN does have fire response plans in place.
Ihī'ihī (Marsilea villosa)	1	1161	Monitor and control development affecting Makapu'u	Ongoing Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Bishop Estate	Management: Land Use	Internal Administrative, Internal Field Assistance	Until the area is developed as a state park, continual monitoring of development in the area occurs to ensure no impacts to the Marsilea villosa population.
Ihī'ihī (Marsilea villosa)	1	1162	Control alien plants at Makapu'u	Ongoing Not Current	FY 2007		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Bishop Estate	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	Initiated contact with State Parks re: how to implement management actions for site
Ihī'ihī (Marsilea villosa)	1	1163	Limit trampling and off-road vehicle use at Makapu'u	Ongoing Not Current	FY 2007		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Bishop Estate	Management: Habitat Maintenance and Manipulation, Management: Land Use	Contract, Internal Administrative, Internal Field Assistance, Internal Technical Assistance, Volunteer	Initiated contact with State Parks re: how to implement management actions for site

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Ihi`ihi (Marsilea villosa)	1	1164	Reduce risk of fire at Makapu`u	Ongoing Not Current	FY 2007		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Bishop Estate	Management: Habitat Maintenance and Manipulation	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	This is currently the biggest threat to this species at this site. A fire in the May 2005 burned a large portion of the population. Surveys conducted in 2006 indicate species was not negatively impacted by this fire, which moved rapidly through the population. Initiated contact with State Parks re: how to implement management actions for site.
Ihi`ihi (Marsilea villosa)	1	121	Conduct additional surveys at Kamaka`ipo	Complete	FY 1995 - FY 1999	FY 2006	U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Alpha USA, Inc.	Research: Population Surveys	Contract, Graduate Student, Internal Field Assistance, Species Expert	Additional surveys have been conducted, but the population has not been relocated since 1991, until rediscovered in 2005. Remaining suitable habitat was surveyed in 2006, but no additional plants were found.
Ihi`ihi (Marsilea villosa)	1	122	Protect Kamaka`ipo	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Alpha USA, Inc.	Acquisition: General	Internal Administrative, Species Expert	Cattle have been removed, but no agreement is in place to protect yet. Plants are within the coastal zone setback, but not otherwise protected and are adjacent to a proposed residential development. The development plans include management of the population.

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Ihī'ihī (Marsilea villosa)	1	123	Protect Moki' o	Ongoing Not Current	FY 2007		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Molokai Ranch	Acquisition: Easement, Acquisition: Fee Title, Acquisition: Other	Contract, Internal Administrative, Internal Technical Assistance, Species Expert	In late 2006, Molokai Enterprise Community, a land trust, completed a plan that included protection of Moki' o Point. The land trust does not yet have any land, but the first transfer should happen soon and include Moki Point. The trust intends to manage and protect the Moki Point population.
Ihī'ihī (Marsilea villosa)	1	1241	Monitor and control development affecting Kamaka' ipo	Ongoing Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Alpha USA, Inc.	Management: General, Management: Land Use	Internal Administrative	This is an ongoing task until protection is in place. Currently, it is being conducted by Bill Garnett.
Ihī'ihī (Marsilea villosa)	1	1242	Control grazing and trampling by deer at Kamaka' ipo	Partially Complete	FY 2000 - FY 2004		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Alpha USA, Inc.	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	NOTE: Cattle were removed in 2000, but deer have not been addressed.
Ihī'ihī (Marsilea villosa)	1	1251	Monitor and control development affecting Moki' o	Ongoing Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Molokai Ranch	Management: Land Use	Internal Administrative, Internal Field Assistance	This is an ongoing task until protection is in place. Currently, it is being conducted by Bill Garnett.
Ihī'ihī (Marsilea villosa)	1	1252	Making one contiguous population at Moki' o	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Molokai Ranch	Management: Habitat Maintenance and Manipulation, Management: Reintroduction	Internal Administrative, Internal Field Assistance, Species Expert	
Ihī'ihī (Marsilea villosa)	1	1253	Control grazing and trampling by deer and cattle at Moki' o	Partially Complete	FY 2000 - FY 2004		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Molokai Ranch	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	Cattle were removed in 2000, but deer are still present in the area.

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Ihī'ihī (Marsilea villosa)	1	1254	Control alien plant species at Moki'ō	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Molokai Ranch	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	
Ihī'ihī (Marsilea villosa)	1	13	Conduct annual monitoring	Ongoing Current	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources	Research: Population Surveys	Contract, Graduate Student, Internal Field Assistance, Species Expert	Currently, it is being conducted by Bill Garnett.
Ihī'ihī (Marsilea villosa)	1	14	Provide information and education for nursery industry	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources	Other: Information and Education	Contract, Internal Administrative	This task is not occurring rapidly enough, and other, non-native species of Marsilea are being sold in the nursery trade.
Ihī'ihī (Marsilea villosa)	1	15	Preserve genetic stock	Ongoing Not Current	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Bishop Estate, Waimea Arboretum and Botanical Garden, The Nature Conservancy, United States Navy	Management: Propagation	Contract, Internal Technical Assistance	This task has started, but the ex situ collections are not yet sufficient for full genetic representation.
Ihī'ihī (Marsilea villosa)	2	211	Survey site at Loe Lake	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Robinson Family	Research: Population Surveys	Contract, Internal Field Assistance, Species Expert	The island where this population occurs is privately owned and inaccessible.
Ihī'ihī (Marsilea villosa)	2	212	Ascertain if sporocarps present at Loe Lake	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Robinson Family	Research: Population Surveys	Contract, Internal Field Assistance, Species Expert	The island where this population occurs is privately owned and inaccessible.

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Ihi' ihi (Marsilea villosa)	2	221	Protect population at Loe Lake	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Robinson Family	Acquisition: Easement, Acquisition: Management Agreement	Internal Administrative	The island where this population occurs is privately owned and inaccessible, and the landowners are currently not interested in working with any government agency to protect natural resources.
Ihi' ihi (Marsilea villosa)	2	2221	Control grazing and trampling by introduced mammals at Loe Lake	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Robinson Family	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Internal Technical Assistance	The island where this population occurs is privately owned and inaccessible.
Ihi' ihi (Marsilea villosa)	2	2222	Control alien plants at Loe Lake	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Robinson Family	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	The island where this population occurs is privately owned and inaccessible.
Ihi' ihi (Marsilea villosa)	2	2223	Control risk of fire at Loe Lake	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Robinson Family	Management: Habitat Maintenance and Manipulation	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	The island where this population occurs is privately owned and inaccessible.
Ihi' ihi (Marsilea villosa)	2	223	Preserve genetic stock at Loe Lake	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Robinson Family, Waimea Arboretum and Botanical Garden	Management: Propagation	Contract, Internal Field Assistance, Species Expert, Volunteer	The island where this population occurs is privately owned and inaccessible.
Ihi' ihi (Marsilea villosa)	2	231	Survey sites at Mo'omomi	Ongoing Current	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, The Nature Conservancy	Research: Population Surveys	Contract, Internal Field Assistance, Species Expert	Surveyed in 2005 by Bill Garnett, no plants found.

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Ihi`ihi (Marsilea villosa)	2	232	Survey site at `Ilio	Ongoing Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Molokai Ranch	Research: Population Surveys	Contract, Internal Field Assistance, Species Expert	Surveyed in 2005 by Bill Garnett, no plants found, but still suitable habitat to check.
Ihi`ihi (Marsilea villosa)	2	233	Ascertain if sporocarps present northwestern Moloka`i	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources	Research: Population Surveys	Contract, Internal Field Assistance, Species Expert	
Ihi`ihi (Marsilea villosa)	2	24	Preserve genetic stock from extant populations	Ongoing Not Current	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Waimea Arboretum and Botanical Garden	Management: Propagation	Contract, Internal Field Assistance, Internal Technical Assistance, Species Expert	Many different botanical gardens have sporocarps and/or living plants in ex situ collections, but are still far from a complete genetic collection.
Ihi`ihi (Marsilea villosa)	2	251	Protect site at Mo`omomi	Ongoing Not Current	FY 2008		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, The Nature Conservancy	Acquisition: Easement, Acquisition: Management Agreement	Internal Administrative	Bill Garnett is working with Molokai Land Trust to protect this site.

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Ihī'ihī (Marsilea villosa)	2	252	Protect site at 'Ilio	Ongoing Not Current	FY 2007		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Molokai Ranch	Acquisition: Easement, Acquisition: Fee Title, Acquisition: Other	Internal Administrative	The Hawaii Natural Area Reserve Commission has recommended 'Ilio Point as a natural area reserve, but the state has not initiated actions to acquire the site. Since then, in late 2006, Molokai Enterprise Community, a land trust, completed a plan that included protection of Ilio Point. The land trust does not yet have any land, but the first transfer should happen soon and include Ilio Point. The trust intends to manage and protect the Ilio Point population.
Ihī'ihī (Marsilea villosa)	2	2531	Control grazing and trampling by cattle and/or deer to northwestern Moloka'i populations	Partially Complete	FY 2008		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	Cattle no longer being grazed in area.
Ihī'ihī (Marsilea villosa)	2	2532	Control alien plants at northwest Moloka'i	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	
Ihī'ihī (Marsilea villosa)	2	2533	Control risk of fire at northwest Moloka'i	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources	Management: Habitat Maintenance and Manipulation	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	
Ihī'ihī (Marsilea villosa)	2	31	Determine effects of changes in hydrology	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Habitat Requirements, Research: Population Surveys	Contract, Graduate Student, Species Expert	

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Ihi' ihi (Marsilea villosa)	2	32	Develop methods and procedures to control hydrology changes	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Management Techniques	Contract, Graduate Student, Internal Technical Assistance, Species Expert	
Ihi' ihi (Marsilea villosa)	2	33	Develop methods to control alien plants	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Competition, Research: Management Techniques	Contract, Graduate Student, Internal Technical Assistance	Numerous studies on the control of various alien plants have been or are being conducted by the Invasive Species Committees and land managers on each island, and the results of these studies are used to determine the best method of weed control for alien plants found in Marsilea villosa habitat.
Ihi' ihi (Marsilea villosa)	2	34	Develop methods to control introduced mammals	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Management Techniques, Research: Predation	Contract, Graduate Student, Internal Technical Assistance	Studies on the control of feral ungulates have been conducted for numerous other areas, and the results of these studies are used to determine the best method of ungulate control in Marsilea villosa habitat.
Ihi' ihi (Marsilea villosa)	2	41	Develop and implement reintroduction plan for Ni' ihau	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Robinson Family	Management: Planning, Management: Reintroduction	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert, Volunteer	The island where this population occurs is privately owned and inaccessible, and therefore plans are on hold until the landowners are willing to work with government agencies.

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Ihi' ihi (Marsilea villosa)	2	42	Develop and implement reintroduction plan for northwest Moloka'i	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources	Management: Planning	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert, Volunteer	This task will not be initiated until the land for reintroduction efforts is secured, so that the management plan can be specific to the site.
Ihi' ihi (Marsilea villosa)	2	51	Develop augmentation plan for O'ahu populations	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, City and County of Honolulu, Hawaii, Bishop Estate, The Nature Conservancy, United States Navy	Management: Planning, Management: Reintroduction	Contract, Graduate Student, Species Expert	
Ihi' ihi (Marsilea villosa)	2	52	Develop augmentation plan for Moloka'i populations	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Molokai Ranch, Alpha USA, Inc.	Management: Planning, Management: Reintroduction	Contract, Graduate Student, Internal Field Assistance, Species Expert	
Ihi' ihi (Marsilea villosa)	2	53	Develop augmentation plan for Loe Lake	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Robinson Family	Management: Planning, Management: Reintroduction	Contract, Graduate Student, Internal Field Assistance, Species Expert	The island where this population occurs is privately owned and inaccessible, and therefore no plans will be developed until the landowners are willing to work with government agencies.
Ihi' ihi (Marsilea villosa)	2	54	Implement augmentation plans as appropriate	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, City and County of Honolulu, Hawaii, Molokai Ranch, Bishop Estate, Alpha USA, Inc., Robinson Family, The Nature Conservancy, United States Navy	Management: Reintroduction	Contract, Internal Field Assistance, Internal Technical Assistance, Volunteer	This task has not been initiated because no plans have yet been developed.

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Ihī'ihī (Marsilea villosa)	3	61	Study requirements for reproduction and maintenance	Ongoing Not Current	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Demographic Studies, Research: Habitat Requirements, Research: Habitat Status, Research: Population Surveys	Contract, Graduate Student, Species Expert	This task is occurring to some degree as experts monitor the wild populations and learn from their observations. The encroachment of alien plants at the Koko Head site has been closely monitored by University of Hawaii staff. Additional experimental research would be beneficial to determine the detailed environmental needs of the species.
Ihī'ihī (Marsilea villosa)	3	62	Conduct soil analysis	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Habitat Requirements	Contract, Graduate Student	
Ihī'ihī (Marsilea villosa)	3	63	Study long term demography	Ongoing Not Current	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Demographic Studies	Contract, Graduate Student, Internal Technical Assistance, Species Expert	This task is occurring to some degree as experts monitor the wild populations and learn from their observations. Additional experimental research would be beneficial to determine the detailed biology of the species.
Ihī'ihī (Marsilea villosa)	3	64	Determine genetic variability	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Genetics	Contract, Graduate Student, Species Expert	

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Ihī'ihī (Marsilea villosa)	3	65	Determine minimum viable population size	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Other: Regulations, Research: Demographic Studies, Research: Genetics, Research: Habitat Requirements, Research: Habitat Status, Research: Population Surveys, Research: Reintroduction	Contract, Graduate Student, Internal Technical Assistance, Species Expert	
Ihī'ihī (Marsilea villosa)	3	66	Determine association with invertebrates	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Demographic Studies, Research: Habitat Requirements, Research: Other Information, Research: Population Surveys, Research: Predation	Contract, Graduate Student, Internal Field Assistance, Species Expert	
Ihī'ihī (Marsilea villosa)	3	67	Determine associate with birds	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Demographic Studies, Research: Habitat Requirements, Research: Habitat Status, Research: Migration, Research: Other Information, Research: Population Surveys, Research: Predation	Contract, Graduate Student, Internal Field Assistance, Species Expert	
Ihī'ihī (Marsilea villosa)	3	71	Verify # individuals & populations needed to reach downlisting and delisting	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Other: Regulations, Research: Competition, Research: Demographic Studies, Research: Genetics, Research: Habitat Requirements, Research: Habitat Status, Research: Population Surveys, Research: Predation, Research: Reintroduction	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert	

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Ihī'ihī (Marsilea villosa)	3	72	Revise recovery objectives as needed	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Fish and Wildlife Service, Wildlife Resources	Other: Regulations, Research: Competition, Research: Demographic Studies, Research: Genetics, Research: Habitat Requirements, Research: Habitat Status, Research: Migration, Research: Other Information, Research: Population Surveys, Research: Predation, Research: Reintroduction	Contract, Graduate Student, Internal Administrative, Species Expert	